

Claims 1-13 Pending 31
(as amended Feb 25, 2000)
CLAIMS

1. Apparatus for providing a virtual environment, said virtual environment arranged to include one or more entities, the or each entity being represented in the
5 virtual environment by at least a conceptual entity-model, a dynamic entity-model and a visual entity-model, each of said entity models being mutually independent; said apparatus comprising:
- server apparatus arranged to provide
a conceptual-model manager, said conceptual-model manager arranged to
10 provide conceptual entity-models;
one or more dynamic-model managers, the or each dynamic-model manager arranged to provide dynamic entity-models,
one or more client apparatuses, the or each client apparatus arranged to provide a visual-model manager, said visual-model managers each arranged to provide
15 visual entity-models; and
communications apparatus arranged to allow transmission of messages between said conceptual-model manager, said one or more dynamic-model managers and said one or more visual-model managers.
- 20 2. Apparatus according to claim 1, in which the server apparatus is arranged to provide a plurality of dynamic-model managers, wherein said plurality of dynamic-model managers are distributed across a plurality of independent servers.
3. Apparatus as claimed in claim 1 [or claim 2], in which said virtual environment
25 is divided into mutually exclusive zones with the or each entity, represented by respective entity-models, being located in one of said zones, wherein the or each dynamic-model manager comprises:
one or more zone managers, each zone manager being arranged to provide dynamic entity-models in an associated zone.
- 30 4. Apparatus as claimed in claim 3, further comprising a virtual environment manager arranged to associate ones of said zone managers with ones of said zones in response to the behaviour of dynamic entity-models.

5. Apparatus as claimed in claim 4, wherein said virtual environment manager is further arranged to route messages from conceptual entity-models to the appropriate one of said zones in which corresponding dynamic entity model is located.

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6. Apparatus as claimed in claim 4 [or claim 5] in which at least one of the client apparatuses is associated with an avatar entity, wherein said at least one client apparatus is arranged to receive messages from the zone managers associated with both the zone in which the avatar entity is located and the zones neighbouring the zone in which the avatar entity is located.

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7. Apparatus as claimed in 6, wherein a multicast address is associated with each zone manager.

15 8. Apparatus as claimed in any preceding claim in which, in use, said dynamic-model manager is executed from a compiled language whereas said rule-model manager is executed from an interpreted language.

9. Server apparatus for providing a virtual environment, said virtual environment arranged to include one or more entities, the or each entity being represented in the virtual environment by at least a conceptual entity-model, a dynamic entity-model and a visual entity-model, each of said entity models being mutually independent,

said server apparatus comprising apparatus arranged to provide: —
a conceptual-model manager, said conceptual-model manager arranged to
25 provide conceptual entity-models;

one or more dynamic-model managers, the or each dynamic-model manager arranged to provide dynamic entity-models,

and communications apparatus arranged to allow the sending of messages from said conceptual-model manager and said one or more dynamic-model managers
30 and the receiving of messages from one or more visual-model managers, one or more client apparatuses being arranged to provide said one or more visual-model managers, each visual-model manager being arranged to provide visual entity-models.

10. Client apparatus for providing a virtual environment, said virtual environment arranged to include one or more entities, the or each entity being represented in the virtual environment by at least a conceptual entity-model, a dynamic entity-model and a visual entity-model, each of said entity models being mutually independent, said
5 client apparatus comprising:

apparatus arranged to provide a visual-model manager, said visual-model managers each arranged to provide visual entity-models; and

communications apparatus arranged to allow the sending of messages from said one or more visual-model managers and the reception of messages from a
10 conceptual-model manager and one or more dynamic-model managers, a server apparatus being arranged to provide said conceptual-model manager and said one or more dynamic-model managers, said conceptual-model manager being arranged to provide conceptual entity-models and the or each dynamic-model manager being arranged to provide dynamic entity-models.

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11. A method for providing a virtual environment, said virtual environment arranged to include one or more entities, the or each entity being represented in the virtual environment by at least a conceptual entity-model, a dynamic entity-model and a visual entity-model, each of said entity models being mutually independent, said
20 method comprising:

providing a conceptual-model manager, said conceptual-model manager arranged to provide conceptual entity-models;

providing one or more dynamic-model managers, the or each dynamic-model manager arranged to provide dynamic entity-models,

25 providing, one or more visual-model managers, said visual-model managers each arranged to provide visual entity-models; and

allowing transmission of messages, between said conceptual-model manager, said one or more dynamic-model managers and said one or more visual-model managers.

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12. A computer program stored on a computer readable data carrier which, when loaded onto server apparatus, provides a server apparatus as claimed in claim 9.

13. A computer program stored on a computer readable data carrier which, when loaded onto client apparatus, provides a client apparatus as claimed in claim 10.